

Application No. 10/786,815
Amendment dated 08/5/2005
Reply to Office Action of May 13, 2005

03-AAP-202 (FCM)

Amendments To The Claims:

Please amend the claims as indicated below.

Listing of Claims:

1. (Original) A method of monitoring the presence of engine coolant contamination in lubricant comprising:
 - (a) disposing at least two electrodes in the lubricant and applying a relatively low voltage alternating current to one of said electrodes and sweeping the frequency of the voltage over a predetermined range;
 - (b) measuring the current and phase angle at a second of said electrodes at predetermined frequency intervals during the sweep and computing the reactance and resistance at each current measurement;
 - (c) determining the least value of reactance Z''_{\min} from said computing;
 - (d) selecting a frequency f_i , less than the frequency corresponding to Z''_{\min} ;
 - (e) exciting said one electrode with said voltage at the frequency f_i and measuring the current and phase angle at said second electrode and computing the reactance Z''_i and the resistance Z'_i ;
 - (f) determining the parameter $\Theta = \arctan \frac{\Delta Z''}{\Delta Z'}$, where $\Delta Z''$ is the change in reactance ($Z''_i - Z''_{\min}$) and $\Delta Z'$ is the change in resistance ($Z'_i - Z'_{@Z''_{\min}}$); and,
 - (g) providing an indication that coolant contamination exists when Θ reaches a predetermined value.
2. (Original) The method defined in claim 1, wherein said step of measuring current includes measuring current over the sweep at frequencies indicative of bulk fluid

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impedance and at frequencies indicative of surface electrode impedance.

3. (Original) The method defined in claim 1, wherein said step of providing an indication that contamination exists includes providing such an indication when Θ reaches an angle of about 40° .
4. (Original) The method defined in claim 1, wherein said step of disposing at least two electrodes includes arranging the electrodes in spaced concentric arrangement.
5. (Original) The method defined in claim 1, wherein said step of sweeping the frequency includes sweeping in the range of about 0.01 Hz to 10 kHz .
6. (Original) The method defined in claim 1, wherein said step of applying a relatively low voltage includes applying an a.c. voltage in the range of about 0.10 to 2.0 volts.
7. (Currently Amended) The method defined in claim 1, wherein said step of measuring current at predetermined intervals includes measuring the current at intervals of about ~~ONE-tenth~~ one-tenth of each decade of frequency sweep.
8. (Original) The method defined in claim 4, wherein said step of applying a relatively low voltage alternating current includes measuring the lubricant temperature and delaying the said applying until the temperature is within predetermined limits.
9. (Original) The method defined in claim 1, wherein said step of providing an indication that contamination exists includes providing such when Θ is about 45° less than the value of Θ for new uncontaminated lubricant.